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Mini Review

Arthroscopic Repair of Hip Labrum Using a Technique of Single Perforation and Double Loop

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Abstract

Introduction: Labral injury repair has been a matter of interest in hip preservation surgery. Multiples fixations methods using anchors have been described. A single labral perforation avoids the loss of the sealing and decreases labral tear risk, whereas a double-loop technique avoids shearing the labrum. Nevertheless, it is still unclear what the best method is to perform the repair.

Objective: We present a technique for fixation of double-loop labral repair, having a unique enter labral site and performed through a single gate, providing joint sealing, resistance to pull out, and lack of eversion or labrum stenosis.

Surgical Technique: By classic anterolateral and a modified anterior portal, minimal capsulotomy is performed with the preservation of an interportal bridge. Superficial drilling of the acetabular rim is performed with a 5.5mm arthroscopic circular burr. Through an 8.5mm cannula, the anchor is placed in the acetabular rim. The suture pin is threaded with the strand, penetrating the labrum close to the chondrolabral junction or through it, creating a suture loop in the intra-articular space. The strand is released from the suture pin, which is removed, and re-entered through the intra-articular space, capturing the loop, and taking it to the extra-articular zone. The suture pin is re-inserted through the loop, and the strand is captured, which is slid through the loop and taken out of the cannula. The result is a double beam knot made with the working strand and the strand pole. The corresponding knots are made and slid according to the traditional technique.

Conclusion: Double-loop and single perforation give the surgeon versatility and capability of fixation in a broad spectrum of labral injuries, allowing a resolution by an arthroscopic standard, recovering the joint seal without any further complication, only limited by the proper set of the anchor and the tightness of the knot.

Keywords: Arthroscopic; Hip; Perforation; Double Loop

Introduction

The acetabular labrum is a ring of fibrocartilage and connective tissue attached to the bony side of the acetabulum. This gives stability, a joint seal and decreases the joint stress because it increases the contact area over the femoral head [1]. The labral injuries have been very interesting for the scientific world because they have a direct impact and an articular deterioration on the population [2].

These injury mechanisms include acute injuries by direct trauma or degenerative injuries caused by a femoro acetabular impingement (FAI) and consequently they generate pain or joint blockage [1,2]. There is, however, a percentage of the population with labral injuries that are asymptomatic [3].

The handling of these labral injuries includes the reparation with a surgery of joint preservation. It is widely accepted that the

gold standard treatment is its reparation with arthroscopy using anchors for its fixation [4-6]. There is, however, controversy in relation with the ideal technique for fixation; this fixation must be replicable with excellent fixation and has to replicate labrum´s anatomy with minimal distortion. Up to date there is no evidence what technique is better than the other [6,7].

We present a technique for fixation of double-loop labral repair, having a unique enter labral site and performed through a single gate which provides a restoration of the joint seal, strong resistance to pull out and having a lack of eversion of its free edge or labrum stenosis.

Surgical technique

The patient in a supine position for surgery is under spinal anesthesia and is lying down on a traction table and a quilted perineal post. The adequate opening of the coxofemoral space with radioassisted preoperative traction is evaluated. Arthroscopic entry is through a classic anterolateral portal made under a fluoroscopic vision, and a modified anterior portal is performed under direct arthroscopic vision. A minimal capsulotomy is performed with preservation of an interportal bridge and a subsequent release of the capsulolabral junction that is adjacent to the injured areas and away from the labral proximal edge to preserve its vascularization. Then a superficial drilling of the acetabular rim is performed with a 5.5 mm arthroscopic circular burr to obtain a vascularized receptor bone, including a greater resection in cases of acetabular over coverage, as in the pincer type deformity.

A plastic 8,5mm radiolucent cannula is placed together with a cannulated guide for drilling the anchor hole. Obviously, we use knot anchors, the angle of support of the guide in the acetabular rim is critical to determine a suitable position which allows to minimize the labral eversion. The arthroscopic camera once the drill is put in place, is oriented towards the adjacent articular surface to evaluate the indemnity of the chondral surface during drilling. Once finished and keeping the guide in its position, the anchor is placed once again verifying the adjacent chondral surface by modifying the orientation of the optic. Two strands will remain inside the radiolucent cannula, one corresponding to the working strand, and the other will be the arthroscopic pole.

The suture pin is threaded with the strand and is inserted through the cannula. The labrum is penetrated close to the chondrolabral junction, or through it, depending on the type of injury found, creating a suture loop in the intra-articular space. The strand is released from the suture pin. This is removed and re-entered through the intra-articular space, capturing the loop, which is taken to the extra-articular zone next to the cannula. The suture pin is re-inserted through the loop and the working strand is captured, which is slid through the loop and taken out of the cannula. The result is a double beam knot made with the working suture and the free arthroscopic post (Figure 1).

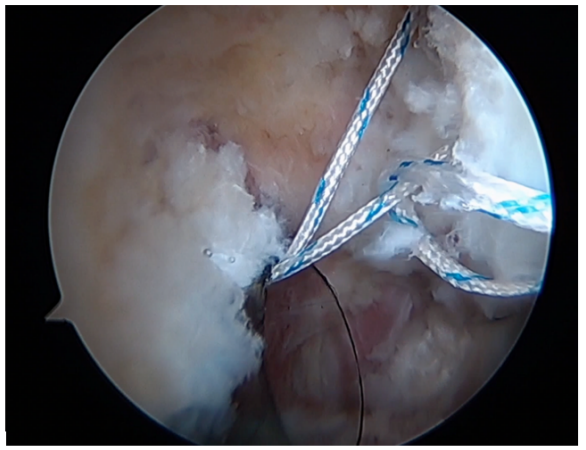

Figure 1

The corresponding knots are made and are slid according to the traditional technique of instrumental use. The tightness of the stitch must be similar to the natural tissue in order to avoid the iatrogenic labral eversion. Also, it is the tightness of the stitch that will decide at last the contact between the stitch and the femoral chondral surface in accordance to the labral free edge. Once finished, a cut is made with an arthroscopic instrument. The process is repeated to place additional anchors (Figure 2).

The stability of the labral injury and the attachment of the chondrolabral junction are re-evaluated and the traction is slowly released. It is evaluated the joint seal recovery, the anatomic reversal of the free edge of labrum and the contact between the stitch and the femoral chondral surface. The same procedure is made with inverse portals to complete the labral re-anchoring. The advantages and limitations of the surgical technique are exposed in table 1.

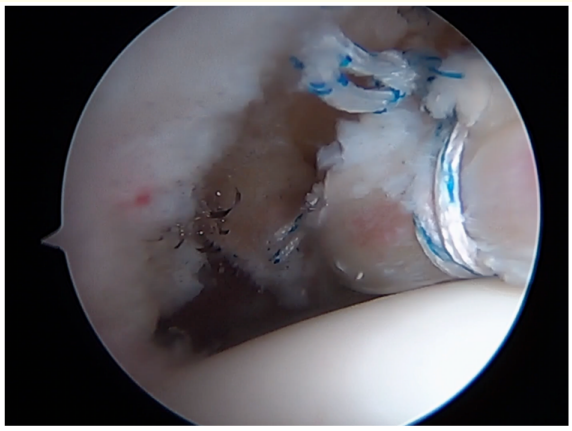

Figure 2

Advantages	Limitations
Double suture gives added strength	Technical difficulty
Less shearing force decreasing labral injury	Proper placing the anchor to avoid eversion
Decreases seal loss with a single perforation	Proper tightness of the stitch to avoid eversion
Preserving an integral chondrolabral attachment	Does not decrease the risk of chondral damage
Allows a repair of the degenerative labral tissue	Maintenance of the triangular shape of the labrum is unknown

Table 1: Advantages and limitations of the single perforation and double loop technique.

Discussion

The benefits of the labral repair over resection have been proved in many reports regarding functions, but it is still not defined what the best technique is to perform the repair [1,7,8].

According to the types of fixations that were proposed, it is possible to observe loop type techniques and base fixations. The final objective is the restoration of the anatomy, stability of the labrum and the recovery of the joint seal function. The loop techniques have been historically questioned because they distort the triangular shape of the labrum when compressed over the stitch site, being able to evert the free edge and provoque stenosis of the labrum and loose its capability as joint seal. However, this is reflected in functional results. Additionally, Phillipon., *et al.* has proved that this type of stitch keeps the triangular structure of the labrum under nuclear magnetic ressonance in patients who have gone into their third post operatory week. Also, he suggests that the anchor place technique is the most fundamental factor in relation with the labral eversion and its shape alteration [10]. Intraoperatively, the closeness of the anchor with the acetabular rim and the tightness of the knot are decisive factors when the labral eversion and shape distortion happens. The reason is that the anchor put far to the rim require more tightness of the knot to get stability and as a consequence increases the labral bulge and the possibility of eversion of the free edge.

In addition, the base fixation techniques do not always work properly: Too much tightness over the base could cause an eversion of the free edge and stenosis and set a non functional labrum [6].

The simple loop techniques have been also criticized because these could shear the labrum when the tightness is fixed, simulating the action of the gigli saw [11]. This problem is likely solved with the double-loop technique, because, when tension is applied over the knot, the stitch is slid and the tightness is absorbed by the knot, avoiding the sliding of the suture over the injured tissue.

Finally, the possibility of damage by abrasion in the chondral tissue of the femur due to the stitch has been exposed. Intraoperatively, is observed that the contact between the stitch and the femoral head depend exclusively upon the applied tension of the fixation. Here, when certain tension is applied, it is the adjacent tissue that touches the femoral head and not the thread which is slightly retracted. The potential damage by abrasion is decreased even more with the set of knots in the capsulabral zone.

This technique presents additional elements. A single labral perforation is made, having two advantages. The first is that it avoids a multiple perforation, avoiding the lose of the sealing of suction [12]. The second, allows a repair of the degenerative labral tissue (less thick), decreasing the risk of labral tear during the suture process.

This technique generates a fixation preserving an integral chondrolabral attachment. Histopathology studies have proved the lack of vascularization in this area could mean a potential limitation for healing and also a possible progress of degeneration on the remnants cartilage due to the increasing of the contact surfaces [13-15].

This technique presents limitations and the success depend exclusively on two factors: The proper set of the anchor over the acetabular rim and the tightness of the knot performed by the surgeon. Failing in any of these factors can cause an eversion of the free edge and a loss of the joint seal.

Conclusion

Our technique, labral fixation technique of double-loop and single perforation gives the surgeon versatility and capability of fixation in a wide spectrum of labral injuries, allowing a resolution by an arthroscopic standard, recovering the joint seal with native labrum without any further complication.

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